SELECTION OF METHOD IN CONSTRUCTION INDUSTRY BY USING AHP METHOD

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I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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ABSTRAK

Kaedah dalam industri pembinaan sangat penting dalam industri pembinaan. Jenis kaedah yang digunakan dalam pembinaan boleh menjejaskan kualiti projek. Kaedah yang membincangkan dalam kajian ini adalah kaedah tradisional, reka bentuk dan pembinaan dan sistem bangunan perindustrian. Menurut (Sutt. J., 2011), dalam kaedah perolehan tradisional, pelanggan akan memasuki kontrak secara berasingan dengan arkitek dan kontraktor. Arkitek akan bertanggungjawab untuk kerja reka bentuk, manakala kontraktor akan bertanggungjawab untuk kerja pembinaan. Oleh itu, reka bentuk dan pembinaan adalah kontraktor menerima tanggungjawab untuk sesetengah atau semua reka bentuk dan sistem bangunan perindustrian adalah sistem pembinaan yang dibina menggunakan komponen pra-fabrikasi. Objektif kajian ini adalah untuk mengenalpasti kriteria dan kesesuaian untuk memilih kaedah penyampaian dalam pembinaan oleh kaedah Proses Hierarki Analitikal (AHP). Proses Hierarki Analisis (AHP) adalah untuk menentukan berat kepentingan parameter. Data itu menyimpulkan, kontraktor untuk Gred 7 sesuai untuk menggunakan kaedah sistem bangunan industri dan kaedah tradisional sesuai untuk kontraktor Gred 1.

KATA KUNCI | Kaedah Tradisional, Reka Bentuk dan Kaedah Membina, Sistem Bangunan Industri, Kontraktor, Proses Hierarki Analisis

ABSTRACT

Method in construction industry is very important in construction industry. The type of method used in construction may affect the quality of the project. The method that discuss in this research are traditional method, design and build and industrial building system. According to (Sutt. J., 2011), in the traditional procurement method, the client will enter into the contracts separately with architect and contractor. The architect will responsible for design work, while contractor will responsible for construction work. Hence, design and build is contractor accepts responsibility for some or all of the design and for industrial building system is construction system that is built using pre-fabricated components. The objectives of this study are to identify the criteria and suitability for selecting delivery method in construction by Analytical Hierarchy Process (AHP) method. Analytical Hierarchy Process (AHP) is to determine the weights of importance of the parameters. The data concluded, the contractor for Grade 7 is suitable to use industrial building system method and traditional method is suitable for the contractor Grade 1.

KEYWORDS | Traditional Method, Design and Build Method, Industrial Building System, Contractor, Analytical Hierarchy Process

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LIST OF ABBREVIATIONS

TM	Traditional Method
D&B	Design And Build
IBS	Industrial Building System
CIMP	Construction Industry Master Plan
CIDB	Construction Industry Development Board, Malaysia
CEI	Construction Engineering And Inspection
PWD	Public Work Department

CHAPTER 1

INTRODUCTION

1.1 Introduction

In this chapter include the background of study, problem statement, research objective, research question, scope of research and significance of research and operational of research. Chapter one also discuss the introduction about the method that most used in the construction industry. This chapter also explain the major of the problem when adopting the method in the construction industry that related with company of construction industry.

1.2 Background Of Study

Given the impact construction methods have on productivity, quality, and cost, their selection is a key decision for the proper development of a construction project, and it is one of the main factors affecting the productivity and efficiency of construction projects (H.R.Thomas, 1990). Construction methods are the means used to transform resources into constructed products (C.B.Tatum, 1988). According to (Illingworth, 1993), programming and management techniques are of little value for a project if construction methods are not the most optimal in terms of cost or are not safe to run.

Firstly, in this research there have a three method in a construction industry. The methods are traditional method, Design and Build (D&B), and Industrial Building System (IBS). Then, Traditional/conventional method also known as separated and co-operative system. The main characteristic of traditional method is design and construction works are separate and will responsible by different firm. In this type of system, architect will full responsible for design work of the project and design will be

done before tender process for contractor begins. Other than that, architect also will act as consultant of client in supervise the construction process and protect the interest of client (Masterman, 1992).

Furthermore, the main characteristic of Design and Build (D&B) method is one organization/firm is responsible for both design and construction work. Therefore, there have only one main contract between the client and main contractor for use as reference. This system seems to be popular in construction industry in nowadays because provide shorten project completion duration, high quality of end product and can early know about the project cost. Because contractor responsible for all aspect in project, therefore it convenience for client to estimate their total cost of the project. Design and build method also known as integrated procurement system (Masterman, 1992).

On the other hand, for Industrial Building System (IBS) is defining as a construction technique in which components are manufacturing in a control environment (on office or site), transport, position and assemble into a structure with minimal additional site work (Hamid, 2008). The Industrial Building System Centre becomes one-stop reference Centre regarding IBS for both government and private sector in order due to ensure the success of CIMP and IBS Roadmap 2011-2015 (CIDB, 2016). According to the IBS Manufacturers Directory by the (CIDB, 2008), majority IBS manufacturers are located in industrial areas such as Klang Valley, Seremban and Butterworth.

1.3 Problem Statement

According to (Mohd Nasrun Mohd Nawi, 2014) was highly critical of the sequential nature of construction processes which often acts as an effective barrier to using the skills and knowledge of all project partners effectively in the design and planning of the project. Such as mechanical and engineering design of construction professionals, as well as facility management expertise was needed during the early stage of a project. In addition, the gap between design and construction processes also contributes to major behavioural, cultural and organisational differences between project individuals and groups.

Some clients and contractor are less excited with the benefits offer by design and build contract because if compare to traditional method, clients have less control and influence to the design matters and inflexibility in makes change. While, contractor need to responsible for both design and construction of the project as different to traditional method which the client will assign different parties such as architect to performed design work. In addition, the number of projects procured under design and build method decreasing from March 2012 to March 2014 (CIDB, 2014).

Other than that, if the contractor need to responsible for both design and construction work they need to liability to all risk resulting from design and construction work in order to complete the project. It is very different to traditional method, which risk from design work will liability by architect (Ling T. M., 2014).

Many small contractors are reluctant to adopt IBS system and prefer to continue using the conventional method of construction. This is due to the fact that small contractors are already familiar with the conventional system and for them the technology suit well with small scale projects and therefore not willing to switch to mechanized based system (Ling T. M., 2014).

Furthermore small contractors lack financial backup and are not able to set up their own manufacturing plants as it involves very intensive capital investment. In this case, financial issues become the main obstacle for small contractors to move forward with the IBS system. Lack of knowledge in structural analysis and design of pre-fabricated components among civil engineers and those related to construction discourages further the implementation of IBS system (Ling T. M., 2014).

1.4 Research Objectives

There is objective of the research that are follows:

a) To identify the criteria for selecting delivery method in construction.

b) To identify the suitability method of delivery by Analytical Hierarchy Process (AHP) method.

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